

**WHAT IS CLAIMED IS:**

1           1. A distributed router, comprising:  
2           a plurality of line connection units;  
3           a main processor disposed to construct and manage a routing table, receive changes of  
4 routing information from adjacent routers, update the routing table, and broadcast changes of  
5 routing information received through internal InterProcessor Communication paths within the  
6 distributed router;  
7           a switching unit coupled to switch transmission of packets between the line connection  
8 units and the main processor;  
9           a plurality of forwarding tables positioned in different corresponding ones of the plurality  
10 of line connection units, to copy, store and manage parts of the routing table; and  
11           a plurality of forwarding processors positioned in different corresponding ones of the  
12 plurality of line connection units, to receive the changes of routing information broadcast by the  
13 main processor through the internal InterProcessorCommunication paths of the distributed router,  
14 update different corresponding ones of the forwarding tables, to ascertain an output port  
15 conforming to said transmission by looking-up forwarding information in corresponding ones of  
16 the forwarding tables for packets received from external routers, and transmitting the packets to  
17 the output ports ascertained, to determine whether an output port of a packet received from the  
18 switching unit is connected to the external router or to the switching unit by looking-up the  
19 forwarding information in the corresponding forwarding table for the packet, to transmit the  
20 packet to the external router when the output port is connected to the external router, and to

21 discard the packet when the output port is connected to the switching unit.

1           2. The distributed router of claim 1, wherein the main processor comprises:  
2           a plurality of input/output interfaces handling packets transmitted and received to and from  
3 the switching unit;  
4           a switch interface buffering packets transmitted and received via the input/output  
5 interfaces, and interfacing with the switching unit; and  
6           a routing table lookup and management unit receiving packets from the input/output  
7 interfaces through the switch interface, and transmitting packets received to the input/output  
8 interfaces in conformance with routing information stored in the routing table, and receiving the  
9 changes of routing information from external routers, updating the routing information with the  
10 changes of routing information, and transmitting updated routing information to the forwarding  
11 processors through the internal Interprocessor Communication paths of the distributed router.

1           3. The distributed router of claim 1, wherein each of the forwarding processors comprises:  
2           an Internet Protocol packet receiving unit for extracting an IP header field from each  
3 incoming packet;  
4           an IP header analyzing unit extracting an IP address required for lookup control from each  
5 IP header received from the Internet Protocol packet receiving unit;  
6           a lookup table storing address indices for the forwarding tables where information on each  
7 packet is stored;

8 a lookup control unit latching the address of the forwarding table intended for reference  
9 from the lookup table using the IP address extracted by the IP header analyzing unit, reading  
10 forwarding information from the forwarding table, and making any one determination of packet  
11 transmission when an output port of the packet input from the switching unit is a port directed to  
12 an external router and of packet discard when the output port is the switching unit;

13 an IP header changing unit changing information of the IP header of each packet based on  
14 the forwarding information obtained by the lookup control unit; and

15 an IP packet transmitting unit transmitting the stored packets according to the changes in  
16 information for the header of each packet to the external router.

1 4. A distributed router, comprising:

2 a plurality of line connection units;

3 a plurality of main processors positioned in corresponding different ones of the plurality  
4 of line connection units, to construct and manage a routing table, receive changes in routing  
5 information from adjacent routers, update the routing table, and broadcast changes of routing  
6 information through IPC paths of the distributed router;

7 a switching unit switching packets received from the line connection units to corresponding  
8 ones of the line connection units to which these packets are transmitted;

9 a plurality of forwarding tables positioned in corresponding different ones of the plurality  
10 of line connection units, to copy, store and manage parts of the routing table; and

11 a plurality of forwarding processors positioned in corresponding different ones of the

12 plurality of line connection units, to ascertain an output port by making a lookup in the forwarding  
13 table for a packet received from an external router and transmit the packet received to the output  
14 port ascertained, to determine whether an output port of a packet input from the switching unit is  
15 connected to the external router or switching unit by making a search of forwarding information  
16 stored in the forwarding table for the packet, transmit the packet to the external router when the  
17 output port is connected to the external router, and discard the packet when the output port is  
18 connected to the switching unit, and update the forward table in response to reception of changes  
19 in routing information broadcast by the main processor through the internal IPC paths of the  
20 distributed router.

1 5. A ping-pong preventing method using a distributed router, comprising:

2 a step 1 in the distributed router having a switch unit connecting a main processor and a  
3 plurality of line connection units, of the main processor updating a routing table, and transmitting  
4 changes of routing information to respective line connection units through internal paths of the  
5 distributed router, when the main processor receives changes of routing information from an  
6 adjacent router;

7 a step 2 of a forwarding processor positioned in each of the line connection units updating  
8 a forwarding table in response to reception of the changes of routing information broadcast from  
9 the main processor through the internal paths of the distributed router; and

10 a step 3 of the forwarding processor receiving a packet from one of an external router and  
11 the switching unit, ascertaining input and output ports of the packet, discarding the packet when

12 the input and output ports are connected to the switching unit, and transmitting the packet when  
13 the input and output ports are not connected to the switching unit.

1 6. The method of claim 5, wherein step 1 of updating the routing table, comprises:  
2 a step 1-1 with the main processor updating the routing table when the main processor  
3 receives the changes of routing information;  
4 a step 1-2 with the main processor adjusting changes in a routing path to fit the forwarding  
5 table of each of the line connection units; and  
6 a step 1-3 with the main processor transmitting the changes of the routing information to  
7 the respective line connection units through the internal paths of the distributed router.

1 7. The method of claim 5, wherein step 3 of the forwarding processor ascertaining input  
2 and output ports, comprises:  
3 a step 3-1 with the forwarding processor ascertaining the output port of the packet received  
4 from an external router by searching the forwarding table for the packet and transmitting the  
5 packet to the output port ascertained;  
6 a step 3-2 with the forwarding processor ascertaining the output port of the packet received  
7 by searching the forwarding table for the output port of the packet received from the switching  
8 unit, and transmitting the packet when the output port is an external router; and  
9 a step 3-3 with the forwarding processor ascertaining the output port of the packet received  
10 by searching the forwarding table for the output port of the packet received from the switching

unit, and discarding the packet when the output port is the switching unit.

8. The method of claim 5, wherein the forwarding processor receiving a packet from one of an external router and the switching unit, and ascertaining input and output ports of the packet in step 3 comprises:

a step of the forwarding processor extracting an IP header from an incoming IP packet;

a step of the forwarding processor extracting an IP address for lookup control from the IP header; and

a step of the forwarding processor ascertaining the output port by using the IP address to make a search of forwarding table using the IP address.

9. A router with a distributed architecture, comprised of:

a main processor updating routing information stored in a routing table and broadcasting changes in said routing information;

a plurality of line connection units;

a switching unit directing transmission of packets between said main processor and said line connection units;

each of said line connection units comprising:

a forwarding table storing a copy of parts of said routing table, and

a forwarding processor making a discontinuance of transmission of any packet received by a corresponding one of said line connection units from said switching unit and

11 designated by a destination address to be subsequently forwarded to said switching unit.

1 10. The router of claim 9, with said forwarding processor comprised of:

2 when the packet has been received from said switching unit and said destination  
3 address indicates an output port of said corresponding one of said line connection units coupled  
4 to an external router, transmitting the packet to the external router, and

5 when the packet has been received from said switching unit and said destination  
6 address indicates an output port of said corresponding one of said line connection units coupled  
7 to said switching unit, making said discontinuance.